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U. S. DEPARTMENT OF
AGRICULTURE
FARMERS' BULLETIN No. 1602

REED
CANARY
GRASS



U. S. GOVERNMENT PRINTING OFFICE: 1929

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REED CANARY GRASS is native to the northern half of the United States, but is grown extensively only in the Pacific coast sections of Washington, Oregon, and northern California.

It does best where the climate is moist and cool and is especially suited to swampy or overflowed lands.

The seed habits of reed canary grass are such that it is difficult to harvest the crop by machinery. Seed for planting is therefore scarce and expensive.

Reed canary grass is an excellent hay and pasture plant, both succulent and palatable, providing a long grazing season and large yields of hay.

This grass deserves a wider use in the Northeastern States, particularly on wet lands.

REED CANARY GRASS

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ORIGIN AND HISTORY

REED CANARY GRASS (*Phalaris arundinacea* L.), while not a new grass in either hemisphere, is one of the latest to assume a rôle of increasing importance. In the United States it is found from the New England States westward to the Pacific coast and as far south as Tennessee. The grass is native to the temperate portions of Europe, Asia, and North America.

The cultivation of reed canary grass began in England about 1824 and in Germany about 1850. Cultivation in the United States probably began along the north Atlantic coast shortly after its early use in Europe. At the present time, however, the Pacific coast sections of Oregon, Washington, and northern California have the largest areas of this grass.

According to reasonably authentic records, it was first cultivated in the Coquille Valley of Coos County, Oreg., about 1885, and the original stand is still in existence. A majority of the fields on the Pacific coast can be traced to this early seeding. In various sections of the northern Rocky Mountain States and in southern Canada considerable areas of reed canary grass are found. The origin of the first fields in these sections is not known, but many of them are perhaps native.

An expansion in the acreage of this grass in many sections of the eastern United States is indicated by the increasing quantities of seed purchased. Many new seedings are also being made in the North Central States. Reports indicate that successful stands are being obtained and that forage yields are high.

No diseases serious enough to attract any attention attack this grass, and at present it is troubled very little by insects. During occasional years when grasshoppers and cutworms are numerous, slight damage is done.

¹ This bulletin is based on cooperative investigations by the Office of Forage Crops and Diseases, Bureau of Plant Industry, and the Oregon Agricultural Experiment Station, Corvallis, Oreg.

DESCRIPTION

Reed canary grass is a coarse perennial 2 to 8 feet tall with leafy stems, usually stout enough to prevent lodging, tending to grow in dense tussocks or bunches 2 to 3 feet in diameter and spreading underground by short, scaly, creeping branches or rootstocks. The leaves of the ordinary variety are broad, smooth, and light green in color; the inflorescence is a semidense, spikelike panicle varying from 2 to 8 inches in length. (Fig. 1.)

The seeds are oblong, blackish, brown, or gray in color, smooth, and free from lint or chaff. Well-matured, clean seed weighs 44 to 48 pounds per bushel.

The seeds mature from the top of the panicle downward and shatter very easily after ripening, especially if the weather is dry and warm. Good seed will test 95 to 98 per cent purity. The purity is high because in general where reed canary grass grows few grasses or plants are found whose seeds will get mixed with it. Germination varies from 20 to 90 per cent; low germination is due partly to immature seeds. These are always present as the result of early harvesting to prevent loss from shattering. Some of the seed germinates very slowly, which may be an additional reason for the thin stands often obtained. There are approximately 564,000 seeds in 1 pound.

There are numerous variations in the ordinary variety of reed canary grass. Several of these have been segregated and are being tested in sections where the grass thrives. A variety with variegated leaves and botanically known as *Phalaris arundinacea picta*, commonly called ribbon grass, is grown as an ornamental.

CLIMATIC ADAPTATIONS

Reed canary grass does best where the climate is moist and cool; but it is not sensitive to heat or cold, growing successfully where winter temperatures drop below zero and where summer temperatures occasionally reach 100° F. Where average mean minimum temperatures in winter are above 45° or average mean maximum temperatures in summer are above 80°, however, it is not very successful. Cool weather is especially desirable during the winter dormant period. (Fig. 2.)

SOIL REQUIREMENTS

Reed canary grass makes its best growth on fertile, moist, or swampy soils, is especially suited to swampy or overflowed lands of a sandy, mucky, or peaty nature, and makes an excellent growth on loams and clays of good fertility. The grass is not suited to salt marsh or alkali soils. Moving overflow is not detrimental to this grass during either the dormant or the growing season. Deep-ponded water is not especially injurious to it when dormant, if it does not remain too long, but deep-ponded water during the growing season usually results in considerable loss of plants. Winter overflow is apparently beneficial, because there is practically always increased growth following an overflow season.

Although naturally a moist or wet land grass, it makes a very good growth on high, well-drained, productive soil if supplied with ample moisture for spring and early-summer growth. Its moisture-loving habits make it adapted to irrigation in cool climates.



FIGURE 1.—Reed canary grass (*Phalaris arundinacea* L.): 1, Plant showing habit (about one-sixth natural size); 2, a panicle (slightly reduced); 3, floret (much enlarged); 4, single spikelet (much enlarged)

SEED-BED PREPARATION

Four kinds of seed beds are used for reed canary grass on the Pacific slope. These are well-cultivated land, newly slashed and burned-over land, semicultivated land, and uncultivated land.

The most satisfactory stands are usually obtained on well-cultivated land. Seed-bed preparation should be such that the soil is fine, firm, and reasonably free from weeds.

The next most satisfactory seed bed is brush land or timberland, newly slashed and burned over. Most land under these conditions is reasonably free from weeds, and the natural ashy seed bed is often as good as or better than can be prepared by machinery. On land suited to reed canary grass along the Pacific coast it is very often

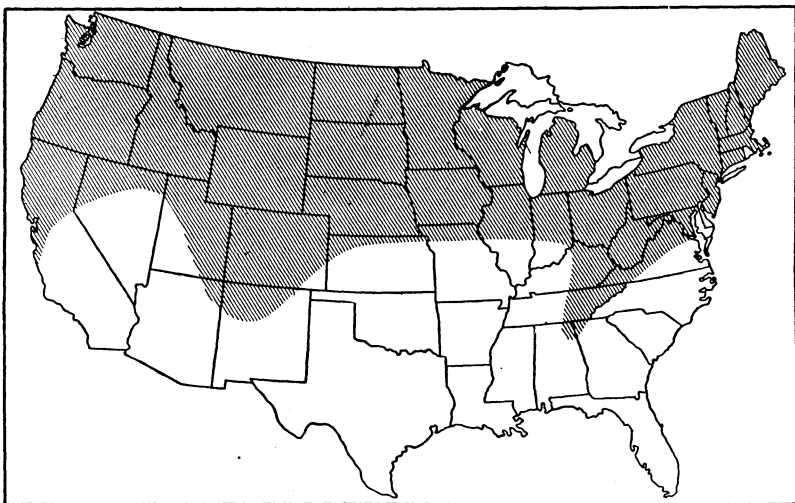


FIGURE 2.—Region of the United States to which reed canary grass is adapted. In the dry sections of the Rocky Mountain States and in the Great Basin it can be grown only when irrigated, except in the high mountain meadows where moisture conditions are favorable

used as the "breaking in" crop after slashing. The stands are allowed to remain until the stumps have decayed sufficiently to be easily removed by pulling. After the stumps are cleared off, the land may be used for other crops or the stand thickened by seeding in vacant spots.

Rough, semicultivated lands are often used if suited by moisture and soil conditions to this grass. Any cultural operations that will stir the surface and form a partial seed bed are of much help in obtaining a stand of grass. Disk or spring-tooth harrows are usually the most suitable implements for this purpose. The degree of success with this method usually depends very largely on favorable natural conditions.

The most unsatisfactory seed bed for reed canary grass is the uncultivated or unburned one. Seeding this grass on land with a growth of brush or grass or both affords a chance for only a partial stand. Occasionally partial success is obtained by seeding on the

mud as the water recedes from swampy land that is not too brushy or grassy. On these lands, however, after a few plants are established the vegetative spread of these and the natural distribution of the seed produced by them sometimes result in considerable areas becoming well stocked with reed canary grass plants.

DATE OF SEEDING

Both fall and spring seedings are successful on the Pacific coast, but in the Central and Eastern States it is best to seed in the early spring. Where winter temperatures do not cause heaving of the young seedlings and winter overflows do not occur until the seeds are germinated and the seedlings well established, fall seeding on reasonably well-prepared seed beds is satisfactory. On burned-over lands fall seeding is better than spring seeding, as the land is in better condition, no further seed-bed preparation is necessary, and the full value of the ashes is realized.

In general, in most of the reed canary grass sections spring seeding is most satisfactory on cultivated lands. On these lands a longer seeding season is usually possible, good seed beds can more easily be prepared, and there is little danger from overflow on low land. Where these conditions exist, seedings may be made from February to June, depending on climatic and soil-moisture conditions.

Reed canary grass seed germinates very slowly. Under ordinary temperature and moisture conditions it takes from 24 to 40 days for complete germination. This point must be considered in making fall seedings. When seeding in the fall on land that may overflow it is especially advisable to seed early so the seed will not wash away and the seedlings will be well enough established to resist washing or drowning out.

RATE OF SEEDING

On well-prepared seed beds where ample moisture is available for maximum germination and continuous growth and the probability of plant loss is small, 5 to 8 pounds of good seed to the acre are used by many farmers and excellent stands obtained. Because of the high price of seed, the use of larger quantities to act as an insurance of good stands on land receiving little or no seed-bed preparation is a practice of doubtful value. Thin stands gradually improve if the land is suited to the crop.

METHOD OF SEEDING

Several methods of sowing are practiced. Fall seedings are nearly always made alone, either with a grass-seed drill or a grass-seeding attachment on a grain drill or by broadcasting. The seed should be covered very lightly, not over 1 inch. Broadcast seed can be covered sufficiently with a brush drag or a spike-tooth harrow with the teeth inclined backward at an angle of 45°.

Reed canary grass is seldom sown in combination with other grasses, but it may be sown with small grains. Combination seedings are usually made on land of good fertility and plentiful moisture supply. When seeding with a companion crop the seed may be sown with a grass-seeding attachment on the grain drill or broadcast either

before or after drilling the grain. In order to cover as much seed as possible it is advisable to give the field a light dragging or harrowing after either method of seeding.

Sowing alone in the spring usually gives the most uniform stands, but spring seedings are often made with a small grain on low, fertile soils plentifully supplied with moisture during the summer. This practice is very common in western Oregon and western Washington. Spring oats or barley are generally used. Usually after the grain crop is harvested the new stand of grass is large enough to furnish considerable fall and early-winter pasture.

Fall seedings with winter grain are sometimes made if the land is adapted to both crops. However, lands dry enough to produce fall grain are of doubtful value for reed canary grass unless they may be irrigated. Combination fall seedings should be made during September or early October.

Seedings of reed canary grass in cultivated rows on rather dry upland have been successful in several sections. The seedings made either in the fall or in the spring in rows 16 to 20 inches apart are cultivated the first year. This results in the establishment of a good root system and thrifty plants. During the second year the plants spreading by means of their rootstocks usually occupy most of the spaces between the rows and an almost solid stand is obtained.

Small areas to be used as nurseries or seed plots may be planted vegetatively. The rootstocks grow very readily. It is good practice to cultivate the first season unless the rootstocks are planted close together on fertile, moist soil. They should be set at intervals of 8 to 12 inches about 2 inches deep. This method may be useful where it is desired to propagate certain special strains.

USE AND VALUE AS PASTURE

Reed canary grass is primarily a pasture grass. Its long life, long grazing season, and the large quantity of very succulent, palatable forage produced make it a valuable pasture plant where it thrives.

Because of the type of land on which it makes the most growth, as well as its rapidity of growth, it is better suited to dairy or beef cattle than to sheep or other kinds of livestock. The rapid, rather soft growth makes it a somewhat washy feed. Many dairymen feed a ration of grain with a small quantity of concentrate to offset this characteristic and, as they say, "to give it more body." On overflowed or low, rather swampy land in sections where winters are open the pasture season is usually the time between flood periods or as soon as the land gets firm enough to hold the stock. Along the Pacific coast good stands on reasonably well-drained land furnish pasture for nine months each year; on higher, drier lands the effective pasturing season is not so long. In sections where long winters occur the pasture season can usually be considered as extending from shortly after the last heavy frosts in the spring to the early heavy freezes in the fall.

Under Pacific coast conditions 1 acre of good reed canary grass pasture on land well suited to it and properly handled will furnish fresh feed for four dairy cows for seven months each year. For the best quality of pasture the grass should not be allowed to make

excessive growth and get old or tough. It is one of the earliest grasses to begin growth in the spring and will withstand pasturing well if not grazed too closely or too long continuously. Reasonably close grazing improves the quality of the pasture. (Fig. 3.)

Rotation pasturing is practiced by the more successful livestock men. This results in better utilization and a better quality of pasturage. Rotation grazing makes it possible also to use parts of the pasture for hay or seed production, if conditions are such that all of the areas can not be pastured economically.

During late spring overflows this grass will grow in the water. Some farmers pasture it under these conditions. This is not desirable; it is detrimental to the soil and injurious to the grass.

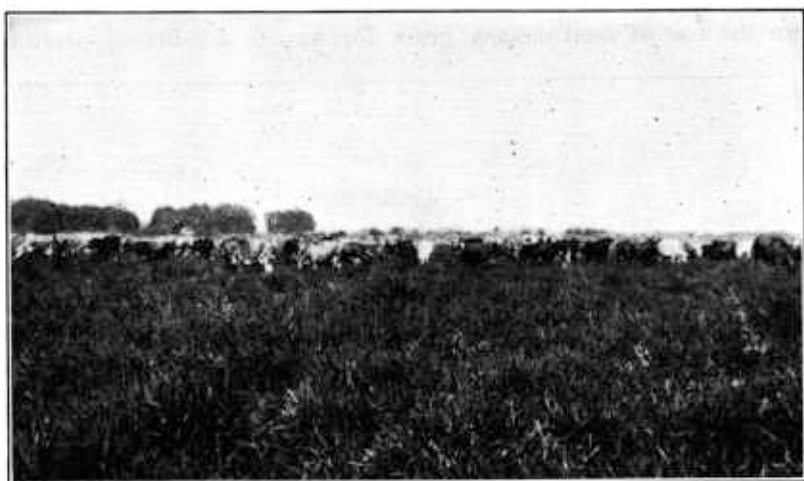


FIGURE 3.—Dairy cattle pasturing reed canary grass on the Pacific coast. Note the heavy, bunched growth of the grass

METHODS OF HAYMAKING

The use of reed canary grass for hay is increasing. During its early history it was considered of little value for hay because of coarseness, low palatability, and the large proportion wasted by livestock. These deficiencies were mostly the results of lack of knowledge regarding the proper methods of handling.

The best quality of reed canary grass hay is obtained from thick stands pastured early in the season to retard the haymaking period and to produce leafier crowns and stems. The early season growth is usually very heavy and the stems coarse. During seasons of excessive late spring rains considerable lodging may take place.

Reed canary grass should be cut for hay when approximately 25 per cent of the early heads are in the blooming stage. It has a long heading season, and if the cutting time is delayed until the late heads are in bloom the hay is coarse and stemmy.

The hay cures rather slowly on fertile, moist lands because the large stalks settle rather closely to the ground after cutting. Tedders are effective and often used to accelerate the curing of such

heavy crops. On higher, drier land, curing is more rapid because of lighter crops and drier soil.

Reed canary grass hay is nearly always shocked and allowed to remain until well cured. It is dangerous to stack or mow this hay until it is thoroughly cured, because it heats very easily and rapidly, and loss by fire or decay may result.

YIELDS AND QUALITY OF HAY

Yields of 4 to 9 tons of field-cured hay to the acre are obtained. In some sections where limited pasturing is practiced two cuttings a year are possible. Reed canary grass is not a high-class hay grass generally, but its suitability to wet and overflowed lands makes it a valuable hay grass on such soils. On account of the high yields per acre the use of reed canary grass for hay is considered profitable



FIGURE 4.—Cutting reed canary grass for hay after the seed has been harvested

under such conditions, even though the palatability and nutritive value are not so high as in some other grasses. When it is fed to dairy cattle, beef cattle, or sheep, a grain ration with a small addition of some concentrate such as linseed, soybean, or cottonseed meal results in more profitable use of the hay. Livestock men consider the hay alone a good maintenance feed for wintering cattle. Large quantities are made available to the animals because there is usually some waste. This is especially true with late-cut plants when the stems are large and hard and the curing is done under unfavorable conditions. Recent seed-production practices have resulted in the cutting of the grass after the seed has been harvested. The hay made under such conditions is sometimes quite ripe and harsh. (Fig. 4.)

SILAGE AND SOILING VALUE

Reed canary grass is being used in increasing quantities for silage. Prepared as silage, it is a palatable, nutritious feed. The yield is large, ranging from 15 to 25 tons to the acre. Its use for silage makes

possible a cheap succulent winter feed in sections where other silage crops often do not grow well or are too expensive to use profitably. The silo is a means of saving the grass when it is difficult or impossible to cure it for hay. The making of reed canary grass silage is most common at present in the Coos Bay section of Oregon. It is being fed to beef and dairy cattle with good results.

Only small quantities of reed canary grass are now used for soiling. Where very intensive livestock feeding is practiced, this grass may be so used, but its best use is as pasturage.

CHEMICAL COMPOSITION

Comparative analyses of reed canary grass forage with other forages as shown above indicate that as fresh feed it is practically equal to timothy and redtop and considerably better than winter oats. (Table 1.) As hay it has a lower feeding value than the other crops. As silage it compares very favorably with winter oats, corn, or vetch and oats.

TABLE 1.—*Comparative analyses of reed canary grass and other forage crops*

Forage	Constituents (per cent)					
	Dry matter	Ash	Crude protein	Crude fiber	Fat	Other carbohydrates
Reed canary grass, fresh.....	37.00	2.90	3.60	10.90	1.10	18.50
Timothy, fresh.....	37.50	2.20	3.10	11.70	1.20	19.30
Redtop, fresh.....	39.30	2.70	3.10	12.20	1.10	20.20
Winter oats, fresh.....	26.10	2.10	3.20	7.80	1.10	11.90
Alsike clover, fresh.....	24.30	2.40	4.10	6.50	.60	10.70
Reed canary grass hay ¹	92.88	4.79	4.85	27.20	1.06	54.98
Timothy hay.....	88.40	4.90	6.20	29.80	2.50	45.00
Redtop hay.....	90.20	6.80	7.40	28.70	2.30	45.00
Winter oat hay.....	88.00	6.80	8.40	28.30	2.80	41.70
Alsike-clover hay.....	87.70	8.30	12.80	25.70	2.50	38.40
Reed canary grass silage ¹	30.49	1.97	1.48	11.16	.58	15.30
Winter-oat silage.....	28.30	1.90	2.00	9.80	1.30	13.30
Corn silage.....	26.30	1.70	2.10	6.30	.80	15.40
Vetch and oats silage ¹	26.42	1.92	2.14	8.85	.60	12.91

¹ Analyses by J. S. Jones and D. E. Bullis, Oregon Agricultural Experiment Station; all others by the following: HENRY, W. A., and MORRISON, F. B. FEEDS AND FEEDING, A HANDBOOK FOR THE STUDENT AND STOCKMAN. Ed. 18, pp. 709-721, illus. Madison, Wis. 1922.

The exceedingly heavy yields and high palatability in many cases offset the differences in nutritive value when considered on the basis of the cost per ton of feed.

SEED PRODUCTION

Seed production of reed canary grass is developing rapidly along the Pacific coast, mainly in Coos County, Oreg. Until five years ago most of the seed handled by dealers was imported from Europe. Present production in commercial quantities on the Pacific coast is now supplying the demand in this country to a considerable extent. In western Oregon seed matures in late July and early August if the grass has not been pastured late or cut previously for hay.

Most of the seed is harvested by hand. The heads are cut off near the base or stripped, put in tight cloth bags, and taken to curing racks.

or buildings for drying. During bright warm weather outside curing racks are used. These consist of a series of two or three shelves made of fine poultry netting and arranged one above another. The ground underneath is covered by canvas to catch shattering seed. The newly harvested heads are spread on the racks to dry, and an occasional stirring causes more rapid drying. As soon as it is dry the seed is threshed out with a flail or a fork and cleaned. Barn floors are often used for drying, and although it usually takes longer to complete the process the probable loss by rain is eliminated. (Fig. 5.)

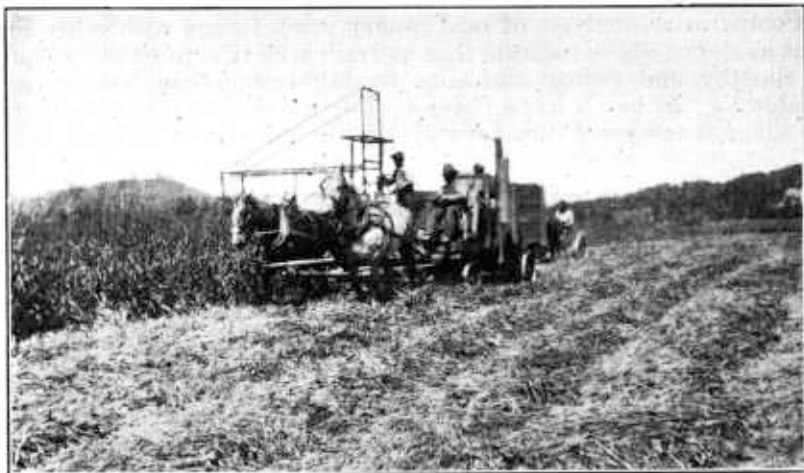


FIGURE 5.—A homemade machine harvesting reed canary grass seed

A seed harvester, a machine resembling a header, has been used to some extent in Coos County, Oreg. The heads are cut off with as little of the stem and leaves as possible, conveyed to baskets, and taken to drying racks or sheds. Underneath the conveyors and behind the sickle are screens and pans to catch as much as possible of the seed that shatters during cutting. Another method used during recent years is to ride through the fields on horseback cutting the heads and putting them into baskets attached to the saddle. In hand cutting, shears, sheep shears, or small sickles are usually used.

The yield of seed is very variable, running from 30 to 150 pounds to the acre. The average person in a good field will harvest from 20 to 40 pounds of seed per day by hand.

Largely because of harvesting expense and rather limited markets, the seed is expensive, present prices ranging from \$1 to \$1.50 a pound. There are apparently several strains of the ordinary reed canary grass. A number of experiment stations are working on the problem of obtaining nonshattering types. If this work is successful, it should result in lower prices for seed and a more general use of the grass.